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Improving Disease Reporting in Los Angeles County: Trial and Results

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Synopsis

A telephone survey of physicians in Los Angeles County revealed that 50 percent of 405 contacted were unaware of the legal mechanism for reporting

communicable diseases—the Confidential Morbidity Report (CMR) card. After that survey, three measures were taken in an effort to improve reporting and surveillance: (a) use of a stamped self-addressed CMR postcard, (b) publication of the monthly newsletter "Public Health Letter," which was distributed to 23,000 health professionals in Los Angeles County free of charge, and (c) initiation of an active disease surveillance system that included 171 reporting sites contacted weekly (76 physicians, 36 schools, 33 preschools, 22 hospitals, and 4 university student health centers).

No increase in the levels of disease reporting was observed, based on 4 years' experience with the revised CMR card and the Public Health Letter. The active disease surveillance system, however, has provided anecdotal reports of disease occurrence and notification of outbreaks of both reportable and nonreportable diseases. Moreover, the authors believe it has improved rapport between the county health department and the medical community.

THE REPORTING of 57 communicable diseases—the number was 55 until AIDS (acquired immunodeficiency syndrome) was added in 1983 and listeriosis in 1985—has been mandatory in California since May 1955 (1). Anyone with knowledge of an occurrence of any of those diseases is required to report directly to local health authorities. Further, laboratories in California are required to report five diseases: diphtheria, gonorrhea, syphilis, tuberculosis, and typhoid. The primary mechanism for reporting is the Confidential Morbidity Report (CMR) card.

Responsibility for the surveillance of communicable diseases in Los Angeles County, a large urban area with an estimated population of 8 million, lies with the county health department (2). (The actual population may be considerably larger;

a substantial amount of undocumented immigration to the area occurs each year.) Specifically, the centrally located Disease Control Unit of the Los Angeles County Department of Health Services conducts routine surveillance of infectious diseases. This unit has relied upon traditional passive reporting. The usefulness of passive reporting for community disease surveillance has been well documented (3).

As in other health jurisdictions, reporting in Los Angeles County is believed to be far from complete (4-6), although the precise level of underreporting is not known. During a measles epidemic in 1977, for example, we estimated that only 10 percent of the incident cases were actually reported to health authorities (1).

Described in this paper are the efforts of the

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health department (a) to determine the level of knowledge among physicians concerning the required reporting of communicable diseases in Los Angeles County and (b) to determine if an improvement in methods for reporting diseases and greater feedback to the medical community would promote increased reporting of infectious diseases in Los Angeles County, as well as improve knowledge among physicians concerning the requirements for reporting diseases. We report on the steps taken to improve reporting, what the results were, and the active disease surveillance system that was ultimately developed.

Methods

First survey of physicians' awareness. In January 1979 we conducted a telephone survey of physicians listed in the directory of the Los Angeles County Medical Association (approximately 50 percent of the licensed physicians in the county are members). A 10 percent systematic sample of 4,430 physicians in designated specialties provided the study population of 443. Only physicians with specialties in pediatrics, general medicine, family practice, internal medicine, and general preventive medicine were included because we believed that physicians in these specialties were most likely to treat patients with infectious diseases. The sample population was stratified by medical specialty and geographic location prior to selection so that a 10 percent sample of each specialty in each of the 25 county health districts was selected. All specialties were not equally represented in each district, but a sample selected in this manner was believed to be representative of the physician population in each health district. A questionnaire was administered by telephone to the selected physician or a designated staff member identified by the physician as

having knowledge of the patient population and usual office practices and procedures.

For a group practice, respondents reported either on the practice of an individual physician or the group. Specialty groups reported only on patients seen by the specialist selected, but groups in which all physicians are likely to see all patients reported on group practices and procedures. The questionnaire addressed two principal areas: knowledge of the State's official list of reportable diseases and familiarity with reporting procedures. Questions also were asked regarding the size of the practice, the proportion of the caseload that consisted of communicable diseases, the length of time the physician had practiced in Los Angeles County, and the most frequently seen conditions.

Changes in reporting mechanism and feedback. Three major steps were taken to improve disease reporting.

- *Publication of the monthly newsletter entitled "Public Health Letter."* In September 1979, the Disease Control Unit began publishing a monthly newsletter similar to the newsletters of several other State and city health departments. Current information on disease occurrence, outbreaks, and other issues of public health concern, including original data from departmental studies, was presented. We included in the first edition a request of all professionals for improved disease reporting and quoted the State's reporting regulations. The first edition of the newsletter was distributed to approximately 18,000 licensed physicians—a list of all licensed physicians was obtained from the State of California Board of Medical Quality Assurance—and 5,000 other health professionals in Los Angeles County (veterinarians, dentists, and hospital and laboratory personnel).

- *Introduction of a stamped self-addressed CMR postcard.* For Los Angeles County, we developed a CMR card that was both self-addressed and postage prepaid—features that the card distributed by the State health department did not have. Otherwise, the information on the new CMR card was identical to that on the State's CMR card except for one added component: on the back of the new card was a list of reportable diseases (see opposite). To maintain confidentiality, a single gummed edge was used to seal personal information inside of the card. An initial supply of 10 CMR cards was distributed in September 1980 to each of the 23,000 recipients of the Public Health Letter.

CONFIDENTIAL MORBIDITY REPORT

STATE OF CALIFORNIA

SEND TO LOCAL HEALTH DEPARTMENT

DEPARTMENT OF HEALTH SERVICES

PATIENT'S LAST NAME (PLEASE PRINT)

FIRST NAME

MIDDLE INITIAL

PHONE NUMBER

- WHITE, NON HISPANIC
 BLACK, NON HISPANIC
 HISPANIC ASIAN PACIFIC IS.
 AM IND ESKIMO OTHER

SEX

AGE

DATE OF BIRTH

SOCIAL SECURITY NUMBER

ADDRESS: NUMBER & STREET

CITY

ZIP

COUNTY

COUNTY CODE

DISEASE — (COMPLETE BELOW FOR HEPATITIS, SYPHILIS & TB)

DATE OF ONSET

MO. DAY YR.

REPORTED BY (NAME, ADDRESS & PHONE OF PHYSICIAN, NURSE, HOSPITAL, SCHOOL, INSTITUTION OR AGENCY)

DATE OF DIAGNOSIS

MO. DAY YR.

PHONE NUMBER

DATE OF DEATH

MO. DAY YR.

74480-449 3-86 1.500M ©D OSP

HEPATITIS	HEPATITIS TYPE <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> NON-A, NON-B <input type="checkbox"/> UNSPECIFIED	
	LAB TEST HEPATITIS A:	ANTI-HAV IGM <input type="checkbox"/> POS <input type="checkbox"/> NEG <input type="checkbox"/> NOT DONE <input type="checkbox"/> UNK
	RESULTS HEPATITIS B:	HBSAG <input type="checkbox"/> POS <input type="checkbox"/> NEG <input type="checkbox"/> NOT DONE <input type="checkbox"/> UNK
	SOURCE OF INFECTION <input type="checkbox"/> BLOOD TRANSFUSION <input type="checkbox"/> OTHER _____	<input type="checkbox"/> UNK

TUBERCULOSIS	SITE		BACTERIOLOGY DATE SUBMITTED: _____	
	<input type="checkbox"/> PULMONARY		SMEAR <input type="checkbox"/> NEG <input type="checkbox"/> POS <input type="checkbox"/> PEND <input type="checkbox"/> NOT DONE	
	<input type="checkbox"/> NON-PULM. SPEC. _____		CULT <input type="checkbox"/> NEG <input type="checkbox"/> POS <input type="checkbox"/> PEND <input type="checkbox"/> NOT DONE	
	<input type="checkbox"/> TBN CONVERTER ONLY (LAST 2 YEARS)		ATYPICAL MYCOBACTERIA (SPECIFY) _____	
TBN TEST <input type="checkbox"/> POS INDUR. _____ <input type="checkbox"/> NEG.		TISSUE SPEC <input type="checkbox"/> BIOPSY <input type="checkbox"/> AUTOPSY		
CURRENT DRUGS		EXAM <input type="checkbox"/> MICROSCOPIC <input type="checkbox"/> BACTERIOLOGIC		
<input type="checkbox"/> 1 DRUG <input type="checkbox"/> > 1 DRUG <input type="checkbox"/> NONE		X-RAY <input type="checkbox"/> NORMAL <input type="checkbox"/> CAVITARY <input type="checkbox"/> NON-CAV		
PRIOR TB DRUG TRMT. (> 1 YR. AGO)		<input type="checkbox"/> LYMPHADENOPATHY		
<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> UNK		HEAVY COUGH/SPUTUM PRODUCTION <input type="checkbox"/> YES <input type="checkbox"/> NO		

SYPHILIS	INFECTIOUS		NON-INFECTIOUS	
	<input type="checkbox"/> PRIMARY		<input type="checkbox"/> LATE LATENT	
	<input type="checkbox"/> SECONDARY		<input type="checkbox"/> LATE (SPECIFY FORM) _____	
<input type="checkbox"/> EARLY LATENT: <input type="checkbox"/> < 1 <input type="checkbox"/> > 1 YR.		<input type="checkbox"/> CONGENITAL		

REMARKS

LIST OF REPORTABLE DISEASES AND CONDITIONS

- | | | |
|---|---|--|
| <ul style="list-style-type: none"> Amebiasis *Anthrax *Botulism Brucellosis (Undulant Fever) ²Chancroid *Cholera Coccidioidomycosis, Active Primary and Disseminated Conjunctivitis, Acute Infectious of the Newborn *Dengue *Diarrhea of the Newborn *Diphtheria Disorders characterized by Lapses of Consciousness Dysentery, Bacillary (See Shigella) Encephalitis, Acute Infectious *Food Poisoning, other than Botulism German Measles (Rubella) ²Gonorrhea ²Granuloma Inguinale | <ul style="list-style-type: none"> Hepatitis A (Infectious) Hepatitis B (Serum) Hepatitis, Non-A, Non-B Leprosy (Hansen's Disease) Leptospirosis (Weil's Disease) ²Lymphogranuloma Venereum Malaria *Measles (Rubeola) *Meningitis, Meningococcal Meningitis, Viral or Aseptic Mumps Paratyphoid Fever (See Salmonella) Pertussis (Whooping Cough) *Plague Poliomyelitis, Paralytic Poliomyelitis, Nonparalytic Psittacosis Q. Fever *Rabies, Human *Rabies, Animal (Specify Animal)¹ *Relapsing Fever | <ul style="list-style-type: none"> Rheumatic Fever, Acute Rocky Mountain Spotted Fever Salmonella Infections (Exclusive of Typhoid Fever) Shigella Infections *Smallpox (Variola) Scarlet Fever and Outbreaks of Other Clinical Streptococcal Diseases ²Syphilis Tetanus Trachoma *Trichinosis Tuberculosis Tularemia *Typhoid Fever Cases *Typhoid Fever Carriers *Typhus Fever *Yellow Fever *UNUSUAL OUTBREAKS OF ANY DISEASE |
|---|---|--|

¹ Cases of Animal Rabies should be reported by the Health Officer on a special report form PM 102.

² Report Sexually Transmitted Diseases on the special venereal disease report card if available.

* DISEASES MARKED WITH AN ASTERISK ARE LIKELY TO BE OF URGENT CONCERN AND SHOULD BE PROMPTLY REPORTED, PREFERABLY BY PHONE.

The 1980 Confidential Morbidity Report card used in this study. It was revised in 1986 to include acquired immunodeficiency syndrome and listeriosis in the list of reportable diseases and conditions.

• *Establishment of an active disease surveillance system (ADSS).* In Los Angeles County, a limited hospital reporting system existed that had been used since 1980 to report measles cases only. To represent all areas of the county, this system was expanded in 1981 by adding reports from private physicians, schools, preschools, and universities, and from additional hospitals. A designated contact at each site was telephoned weekly for a report. Twenty reportable conditions (the most frequently reported communicable diseases from the State list, excluding sexually transmitted diseases), along with some reportable only in the County of Los Angeles, such as campylobacteriosis and giardiasis, were sought from each site. Information was also collected on nonspecific gastrointestinal and respiratory illnesses, exanthemas, meningitis, encephalitis, and the predominant clinical illness, as well as any unusual disease occurrence. If no cases were voluntarily reported, the reporter was asked about the predominant clinical illness seen and the number of cases of respiratory and gastrointestinal illnesses during the preceding week. Each reporting site regularly received a supply of worksheets. These worksheets contained the list of conditions by age group. Active surveillance sites were selected for participation in this manner:

—Of 200 acute care hospitals in the county, 22 were randomly selected from strata previously defined by health district and hospital size of at least 150 beds. We attempted to obtain geographic representation and ensure that selected hospitals were large enough to capture a sufficient patient population to be representative. Persons contacted at these 22 facilities generally included the chiefs of the organizational units dealing with infectious diseases or the infection control nurse.

—Physicians were selected with the use of population statistics for each of the 25 health districts in the county. A proportionate population allocation was determined for each health district based on the age distribution in the 1970 census. These age-specific proportions were then applied to the total sample size of 350.

A letter of invitation was sent to 350 (30 percent) of the 1,030 members of the Los Angeles County Medical Association. Of the 350 physicians selected, 76 (21.7 percent) agreed to participate. Reporters at physicians' offices included designated nurses or the selected physician.

—A letter was sent to each of the 82 public school districts in Los Angeles County requesting their

participation in the reporting system. The letter was signed jointly by the county's superintendent of schools and the medical director of the Los Angeles County Department of Health Services. Of the school districts, 36 individual sites, representing 8 districts, were contacted each week. The participating schools and districts, which were self-selected, were given the option of using a single reporting location for each school, a central district location, or a school deemed to be representative of the entire district. A school nurse or the school-district nurse reported for participating schools.

—Preschools were selected using a stratified proportionate sampling method similar to the one used for physicians. There are 1,780 licensed day-care centers and preschools in Los Angeles County, and 33 out of 178 that were selected participated in the ADSS. Directors were the primary reporting source for the preschools.

—Eight of the 65 universities in the county were invited to participate. Medical directors of the universities' student health centers who demonstrated their interest in the project were invited to participate if no hospital facility was located at the same site. Four university student health centers were ADSS participants. The medical directors assumed responsibility for reporting to ADSS. Telephone calls were placed by appointment, at a specific time each week, to each of the designated persons. Data from all reporting sites were collated by an active surveillance coordinator located at the headquarters of the county health department.

Analysis of disease trends. A retrospective review of reportable diseases was conducted to determine if there were any abrupt changes in reporting levels. In particular, attention was directed to the period before and following the initial publication of the Public Health Letter in September 1979 and the introduction of the prestamped CMR card in September 1980.

The number of cases of each reportable disease was compared on a monthly basis with the use of a 3-month moving average (that is, an average, or mean, based upon shifting periods of the same duration). Of particular interest were the nonseasonal diseases such as hepatitis B, hepatitis non-A non-B, and parasitic diseases such as amebiasis and malaria.

Followup awareness survey. In 1983 a second telephone survey of 412 physicians was conducted. Methods identical to those described for the first

survey were used for selecting the sample. A similar survey instrument was used, with the addition of questions about the use of the Public Health Letter and satisfaction with the self-addressed postage-paid CMR card. Unlike the first survey, physicians were identified by medical specialty for analysis.

Results

First survey. Of 443 selected physicians, 405 (or their office staff) were successfully contacted (91.4 percent). Of the respondents, 74.1 percent, or 300, indicated that they were aware of a list of reportable diseases, but only 50.6 percent, or 205, were familiar with the State's CMR card. There were no significant differences observed by type of respondent, that is, physician, nurse, office manager, and so forth.

Public Health Letter. The Public Health Letter has apparently improved physicians' familiarity with disease reporting procedures (see followup survey results). Reader surveys have been conducted and, generally, feedback has been positive.

Analysis. There were no significant increases in the levels of reporting communicable diseases following the introduction of the stamped self-addressed CMR card or in the 12 months following the publication of the Public Health Letter—nor after specific articles focused on reporting practices.

Active disease surveillance. To date, active surveillance has provided identification and confirmation of several outbreaks of disease and disease trends. This system has participants in all areas of the county (see box) and has provided previously unavailable information on non-notifiable diseases such as infant gastroenteritis and respiratory illness. It had long been suspected that infant gastroenteritis (rotavirus) occurred in the fall in Los Angeles County; active surveillance provided confirmation. Identification and laboratory confirmation of an outbreak of Mycoplasmal pneumonia, a nonreportable disease, was obtained, permitting information about diagnosis and special treatment to be targeted to the medical community during the outbreak. Such outbreaks would not have been detected by passive reporting alone. Further, outbreaks of chicken pox among school children and an outbreak of measles have been identified by the ADSS. The system also has provided opportunities for investigating suspected

List of Health Districts in Los Angeles County and Number of Surveillance Participants

<i>Health district</i>	<i>Number of reporting sites</i>
Alhambra	7
Bellflower	7
Central	8
Compton.....	4
East Los Angeles.....	7
East Valley	6
El Monte.....	9
Foothill	5
Glendale	6
Harbor	8
Hollywood/Wilshire.....	3
Inglewood.....	9
Long Beach	8
Northeast	5
Pomona.....	7
Pasadena.....	6
San Antonio.....	4
San Fernando.....	6
South.....	4
Southeast	2
Southwest.....	9
Torrance.....	9
West.....	11
West Valley	15
Whittier.....	6

clusters of appendicitis, diabetes, and sequelae of various viral infections.

A weekly summary of the collected data is distributed to interested health department personnel. Feedback to ADSS participants is accomplished by distribution of a monthly bulletin that summarizes all of the information received. Feedback is given to participants by telephone, when this more expedient method is thought to be necessary.

Followup survey. For the followup survey of physicians' awareness, a total of 394 of the 412 (95.6 percent) selected physicians (or their office staff) was successfully contacted. At that time, 61.2 percent, or 241, of the respondents were aware of the new CMR card. This difference between the first and second surveys was statistically significant (chi-square = 8.5, *df* = 1, *P* < 0.01).

For the followup survey, stratified responses

Responses to the followup survey of physicians, by specialty, to determine their awareness of the self-addressed prepaid Confidential Morbidity Report (CMR) card and the State's list of reportable diseases

Category	Familiar		Unfamiliar		Not sure or no response		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
<i>Aware of CMR card</i>								
All respondents	241	61.2	102	25.9	51	12.9	394	100.0
General practice	60	64.5	23	24.7	10	10.8	93	100.0
Pediatrics	41	73.2	14	25.0	1	1.8	56	100.0
Internal medicine	88	51.2	53	30.8	31	18.0	172	100.0
Family practice	51	70.8	12	16.7	9	12.5	72	100.0
Other specialty	1	100.0	0	0	0	0	1	100.0
<i>Aware of State's list</i>								
All respondents	277	70.3	26	6.6	91	23.1	394	100.0
General practice	78	83.0	5	5.3	11	11.7	94	100.0
Pediatrics	41	73.2	3	5.4	12	21.4	56	100.0
Internal medicine	107	62.9	12	7.1	51	30.0	170	100.0
Family practice	50	68.5	6	8.2	17	23.3	73	100.0
Other specialty	1	100.0	0	0	0	0	1	100.0

were compared by medical specialty. Of physicians in general practice who were surveyed, 83.0 percent of 94 were familiar with the list of reportable diseases compared with 62.9 percent of the 170 who specialize in internal medicine (table). Moreover, 73.2 percent of the 56 pediatricians stated that they were familiar with the CMR card compared with 172, or 51.2 percent, of the internists.

The results of this followup survey revealed that physicians who received and read the Public Health Letter were more than twice as likely to be familiar with the use of the CMR card for disease reporting than physicians who did not. Responses to questions regarding both reading the newsletter and familiarity with the county's CMR card were received from 253 physicians or their staff. Among physicians who reported receiving and reading the Public Health Letter, 62.0 percent were familiar with and used the CMR card compared with only 26.0 percent (odds ratio = 2.3) of physicians who reported not reading the newsletter.

Discussion

Efforts to increase the levels of reporting communicable diseases included publishing articles in an issue of the Public Health Letter that described the reporting responsibilities of health professionals. A list of the diseases that must be reported in California also was published in that issue, as well as appropriate sections of the Business and Professions Code. One article contained a description of an outbreak of hepatitis A traced to a food handler whose case, the index case, had been

diagnosed but not reported by a local physician. The physician's license was suspended for 1 year followed by a 5-year probationary period (1).

Despite the steps taken to improve disease reporting, the generally positive feedback from the private sector regarding the Public Health Letter, and the use of a stamped self-addressed CMR card, no significant increase occurred in the reporting of communicable diseases in Los Angeles County. One possible explanation is that a decreasing trend in disease incidence might have obscured any increase in reporting. We have no evidence to support this hypothesis, however.

Although the level of disease reporting did not dramatically increase, awareness of reporting requirements has improved. During the winter and spring of 1984, Los Angeles County experienced an outbreak of measles. The initial reports of cases came from ADSS participants. In addition, the majority of those reports were made by medical and school district personnel who reported that because of bulletins concerning active surveillance and the Public Health Letter they had become aware of the value of immediate telephone reporting.

Active surveillance, which was developed in some sense as a response to our failure to significantly improve disease reporting after implementing the use of a stamped self-addressed CMR card and the publication of the Public Health Letter, has not dramatically increased disease reporting in Los Angeles County, either. But there have been some important benefits: the rapport between the public and private sectors seems to have improved, and private physicians frequently

call the health department to inquire about diseases that are circulating or about illness patterns. Further, physicians have asked to be included in the ADSS after becoming aware of the system through colleagues or the Public Health Letter.

Other active disease surveillance systems that have had varying degrees of success have been described (7-12). In particular, the State health departments for Colorado, Rhode Island, and Vermont have reported in detail on their experiences. Although the efforts in Los Angeles County did not produce a significant increase in notifiable diseases reporting, we are hopeful that physicians involved in our ADSS will be more likely to report and communicate with the health department (11).

The difference in cost between the active and the passive surveillance systems is significant. Student workers are employed at various centers and spend approximately 20 hours each week telephoning ADSS participants. The estimated cost for conducting active surveillance for a 1-year period, based on 1,257 total student hours required for the 5,016 telephone calls completed, was \$6,838 (based on \$5.44 hourly wage).

The cost of passive surveillance with the use of prepaid self-addressed CMR cards is estimated to be approximately \$10,000 per year. This estimate is based on printing costs—the initial printing of 250,000 cards cost \$4,852.68—in addition to \$0.27 postage for each CMR card (\$0.15 postage plus \$0.12 handling charge). Of the 74,433 cases of infectious disease that were reported in 1981 to the Los Angeles County Department of Health Services, approximately 30,000 were reported with the use of the postpaid, self-addressed CMR card.

Although the cost of each ADSS-reported case in Los Angeles was considerably higher than with the passive surveillance system, it was considerably lower than that experienced in Vermont, as reported by Vogt and coworkers (12). An overall cost of \$6,838 is not an exorbitant amount to pay, considering the size of Los Angeles County and the benefits to be reaped from such a system. For example, during the 1984 Olympics the system was expanded and used to enhance disease surveillance during the games that were held in Los Angeles.

From these surveys, we have identified specific areas of need. Information from our followup awareness survey demonstrated that efforts may need to be directed to particular medical specialties to improve reporting awareness. Specialists in family and internal medicine treat communicable diseases as frequently as physicians in general practice. Yet, the specialists we surveyed were less

familiar with the list of reportable diseases than were general practitioners.

We believe that efforts to increase physicians' awareness of reporting procedures should be continued in Los Angeles County. Improved disease reporting is a continual challenge for all public health professionals. In Los Angeles County, we have demonstrated that physicians' awareness can be improved. Although the effect of the steps taken to improve the reporting of diseases has been negligible, the county health department will continue to provide needed information to health professionals to maintain better communication between the health department and other health professionals and to identify outbreaks of disease in a more timely manner.

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